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2CAN060503

June 7, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: 60-Day Report for ANO-2 Reactor Pressure Vessel Head and Pressurizer
Inspection for Refueling Outage 2R17
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

- REFERENCES:
- 1 NRC letter dated February 20, 2004, *Issuance of First Revised Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors, EA-03-009* (OCNA020404)
 - 2 NRC letter to Entergy dated February 7, 2005, *Arkansas Nuclear One, Unit 2 (ANO-2) - Relaxation Request from Nuclear Regulatory Commission (NRC) First Revised Order EA-03-009 for the Control Element Drive Mechanism (CEDM) Nozzles* (CNRI-2005-002)
 - 3 NRC letter dated May 28, 2004 *NRC Bulletin 2004-01: Inspection of Alloy 82/182/600 Materials Used in The Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at PWRs* (OCNA050408)
 - 4 Entergy letter dated July 27, 2004, *Response to NRC Bulletin 2004-01 Regarding Inspection of Alloy 82/182/600 Materials Used In Pressurizer Penetrations and Steam Space Piping Connections* (OCAN070404)

Dear Sir or Madam:

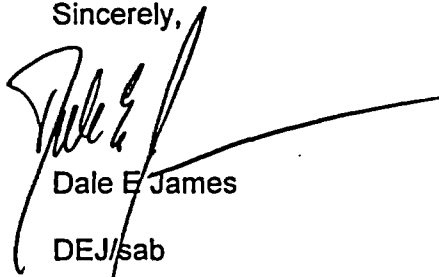
On February 20, 2004, the Nuclear Regulatory Commission (NRC) issued the revised Order addressing inspection requirements for reactor pressure vessel (RPV) heads at pressurized water reactors (Reference 1). Section IV.E of the Order requires licensees to submit a report detailing the inspection results within sixty (60) days after returning the plant to operation. In addition on May 28, 2004, the NRC issued Bulletin 2004-01 (Reference 3) requesting licensees to perform bare metal visual (BMV) inspections of the pressurizer penetrations. If leaking penetrations are discovered additional non-destructive examination of the penetrations were to be performed. Entergy provided its response on July 27, 2004 (Reference 4) where Entergy committed to comply with the bulletin.

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Arkansas Nuclear One, Unit 2 (ANO-2) resumed operation on April 11, 2005. In summary, Entergy did not identify any boric acid leakage or primary water stress corrosion cracking of the reactor vessel head during 2R17. However, nine pressurizer heater sleeves and one previously repaired pressurizer heater penetration were discovered to be leaking. NDE of the leaking heater sleeves revealed only axial flaws and NDE expansion to other heater sleeves was not required. The results of both the RPV head and pressurizer inspections are summarized in the attachment.

This letter contains no NRC commitments. If you have any questions or require additional information, please contact Steve Bennett at 479-858-4626.

Sincerely,



Dale E James

DEJ/sab

Attachment: 60-Day Report for Reactor Vessel Head and Pressurizer Inspection for ANO-2
Refueling Outage 2R17

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Attachment to

2CAN060503

**60-Day Report for Reactor Vessel Head and Pressurizer Inspection
for ANO-2 Refueling Outage 2R17**

60-Day Report for Reactor Vessel Head and Pressurizer Inspection for ANO-2 Refueling Outage 2R17

Arkansas Nuclear One, Unit 2 (ANO-2) is a CE designed unit with Alloy 600 reactor pressure vessel (RPV) head and pressurizer penetrations which are subject to NRC Order EA-03-009 and NRC Bulletin 2004-01 (References 1 and 3). Entergy either complied with the Order or sought relaxation in accordance with the Order and committed to perform NDE per Bulletin 2004-01 (References 2 and 4). Entergy performed inspections of the ANO-2 RPV head and pressurizer during refueling outage 2R17 (spring of 2005). These inspections were conducted in accordance with Section IV.E of the Order and Bulletin 2004-01. The following provides the results of the 2R17 inspections.

Table 1 Summary of ANO-2 Outage Alloy 600 Inspections for 2R17

Inspection Area	Inspection Method	Extent of Inspection	Status
BMV Inspection of RPV Head [NRC Order]	RPV Head BMV	Inspect the RPV head surface 360° around each penetration for boric acid. Inspect the RPV head flange.	BMV performed on 81 CEDM nozzles, 8 ICI nozzles, vent line, and general head condition. No penetrations were determined to be leaking. Rust staining was observed on the head but no wastage was present. No head degradation was observed.
	Pressure Retaining Components	Inspect the CEDM and ICI housings for potential boric acid leakage	Dry boric acid staining identified on several CEDM housings was determined to result from CEDM venting during previous operating cycles. This resulted in the rust staining noted above.
NDE of CEDM Nozzles [NRC Order and NRC approved Relaxation]	UT of 81 CEDM nozzles	Inspect 2" above the J-weld to the blind zone of the CEDM nozzle	81 CEDM nozzles were examined and analyzed from the ID using Westinghouse UT/ECT probes. No flaws were detected.
	Augmented NDE of Nozzle End per NRC Relaxation	Perform Augmented ECT inspection on 76 of 81 nozzle ends	Augmented CEDM ECT data on 76 nozzles was performed. No flaws were detected.
	UT of nozzle Annulus (leak path)	Review interference fit in nozzle annulus above J-weld for leakage path	As part of the CEDM ID exams a zero degree UT probe was used to establish that there was no leak path (wastage) from the nozzle annuli.

NDE of ICI Nozzles [NRC Order]	UT of ICI nozzles	Inspect 2" above the J-weld to the end of the ICI nozzle	The eight ICI nozzles were UT examined from the ID. No flaws were detected.
	ECT of Nozzle Face	Perform ECT exam of ICI nozzle face where UT cannot detect flaws.	An automated ECT on the face of the ICI nozzles was performed. No flaws were detected.

NDE of Vent Line [NRC Order]	ECT of wetted surface area	Perform ECT of entire wetted surface of vent line	The ECT exam of the vent line did not reveal any flaws.
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Pressurizer Inspections and Repair [Bulletin 2004-01]	Heater Sleeve BMV	Inspect all Pzr heater nozzles and MNSA-2 installations for potential leakage	Entergy visually identified nine (9) heater sleeves and one previously plugged nozzle to be leaking. Six (6) previously installed MNSA-2s were inspected with no leakage identified.
	Heater Sleeve NDE	Perform NDE of heater sleeves that have been identified to be leaking	PT of X-1 plugged nozzle revealed axial flaws in weld. No nozzle ID exam could be performed (see Note 1). ECT exams on 9 of 9 heater sleeves revealed only axial flaws (see Table 2).
	Heater Sleeve Repair	Install MNSA-2 on 9 heater sleeves. Perform mid-wall repair on nozzle X-1	The 9 heater sleeves were repaired by use of MNSA-2 assemblies. The previously plugged Pzr heater penetration (X-1) was repaired by a mid-wall weld repair.
	Side shell/Steam space penetration BMV	Perform visual inspection of steam space and butt welds on Alloy 600 pressurizer penetrations	A BMV of the pressurizer side shell nozzles, steam space nozzles and associated butt welds was performed. No leakage was detected.

Other Alloy 600 BMV Inspections [GL 2002-01]	Hot Leg Nozzles	Perform visual inspection of hot leg nozzles	BMV inspections of the hot leg nozzles did not reveal any leakage
	Cold Leg Nozzles	Perform visual inspection of cold leg nozzles	BMV inspections of the cold leg nozzles did not reveal any leakage

Legend:

BMV = Bare Metal Visual

CEDM = Control Element Drive Mechanism

ECT = Eddy Current Examination

ICI = Incore Instrument

NDE = Non-Destructive Examination

PT = Dye Penetrant Examination

UT = Ultrasonic Examination

MNSA – Mechanical Nozzle Seal Assembly

Note 1: Pressurizer penetration X-1 was plugged in the late 1980's using Alloy 600 nozzle and weld material. This penetration was determined to be leaking during 2R17. In preparation to perform NDE of the nozzle bore, a Go-No Go gauge was used to determine NDE examination capability. The gauge could not be inserted to the extent necessary to perform a UT scan. The original weld repair was determined to have distorted the nozzle bore where no useful UT data could be acquired. The NRC staff was notified of this condition during the 2R17 outage.

Table 2 Eddy Current Examination Report of Nine ANO-2 Pressurizer Heater Sleeves Examined During 2R17 Outage

Sleeve	Orientation	Flaw Length	Location
G3	Axial	0.46	ID Flaw Below Weld
	Axial	0.41	ID Flaw Below Weld
X3	Axial	0.57	ID Flaw Below Weld
V1	Axial	0.37	ID Flaw Below Weld
J2	Axial	1.19	ID Flaw Below Weld
	Axial	0.74	ID Flaw Below Weld
P1	Axial	0.41	ID Flaw Below Weld
P2	Axial	0.49	ID Flaw Below Weld
U3	Axial	0.46	ID Flaw Below Weld
H4	Axial	0.30	ID Flaw Below Weld
C4	Axial	0.39	ID Flaw Below Weld